

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) A mobile device for a mobile communication system, comprising:

a case;

a communication module mounted in the case that generates heat in connection with operations; and

a heat dissipation system coupled to the communication module to reduce a temperature thereof during said operations, wherein the heat dissipation system comprises a heat pipe coupled to the communication module that extends to outside the case, and wherein an antenna separate from the heat pipe passes through an inner portion of the heat pipe.

2. (Original) The mobile device of claim 1, wherein said case is established with a main board therein, wherein additional components are mounted on said main board, and wherein said communication module is mounted on one side of said main board.

3. (Currently Amended) The mobile device of claim 1, wherein the heat dissipation system includes a heat exchanging part that is in a direct contact with said case.

4. (Original) The mobile device of claim 1, wherein the heat dissipation system comprises a heat exchanging part is located to face toward an inside of the case that is opposite to said main board.

5-7. Canceled

8. (Previously Presented) The mobile device of claim 1, comprising a heat dissipating plate that thermally connects said heat pipe with the communication module.

9. (Original) The mobile device of claim 1, comprising a heat transfer part including a phase change material that thermally connects to said communication module.

10. (Previously Presented) The mobile device of claim 1, wherein the communication module in contact with said heat pipe, and wherein said antenna passes through an opening in the case that includes the heat pipe without contacting the heat pipe.

11. (Previously Presented) The mobile device of claim 1, comprising a micro-cooling unit coupled between the communication module and said heat pipe having a refrigerant contained within a closed system that comprises,

a coolant reservoir,
a first heat exchanger coupled to the coolant reservoir configured to absorb heat through a thermal contact,
a second heat exchanger operatively coupled to first heat exchanger that is configured to dissipate the heat,
a liquid state refrigerant flow part coupled between the second heat exchanger and the coolant reservoir, and
an insulation part configured to extend between the liquid state refrigerant flow part and each of the the first and second heat exchangers.

12. (Previously Presented) A micro-cooling heat dissipation system, comprising:
a housing having a refrigerant contained within a closed system, wherein the closed system comprises,
a coolant reservoir,
a first heat exchanger coupled to the coolant reservoir configured to absorb heat through a thermal contact,
a second heat exchanger operatively coupled to first heat exchanger that is configured to dissipate the heat,
a liquid state refrigerant flow part coupled between the second heat exchanger and the coolant reservoir, and
an insulation part between the liquid state refrigerant flow part and each of the first and second heat exchangers.

13. (Previously Presented) The micro-cooling heat dissipation system of claim 12, wherein the insulation part includes gas or an insulating material.

14. (Original) The micro-cooling heat dissipation system of claim 12, wherein liquid state refrigerant flow part comprises a plurality of grooves that separate liquid refrigerant into a plurality of channels.

15. (Original) The micro-cooling heat dissipation system of claim 12, wherein two layers of heat dissipating materials comprise the micro-cooling heat dissipation system.

16. (Original) The micro-cooling heat dissipation system of claim 15, wherein said two layers have different heat dissipating characteristics.

17. (Original) The micro-cooling heat dissipation system of claim 12, wherein the first and the second heat exchangers comprise a plurality of capillaries.

18. (Original) The micro-cooling heat dissipation system of claim 12, wherein said micro-cooling heat dissipation system is provided with a first fluid passage in which the refrigerant flows from the first heat exchanger to the second heat exchanger, and wherein the refrigerant in said micro-cooling unit flows by a cooling cycle in which evaporation of liquid refrigerant occurs at the first heat exchanger and condensation of vaporized refrigerant occurs at the second heat exchanger.

19. (Currently Amended) A mobile terminal for a mobile communication system, comprising:

a case;

a device mounted in the case that generates heat in connection with operations;

a heat dissipation system coupled to the device to reduce a temperature thereof during said operations, wherein the heat dissipation system includes a heat transfer part including a phase change material (PCM) part that effects phase changes when a predetermined temperature is reached by the heat transferred through the contact with said device; and

a micro-cooling unit including a housing having a refrigerant therein, a first heat exchanging part for absorbing the heat through a thermal contact with the phase change material part and a second heat exchanging part for dissipating the heat, a liquid state refrigerant flow part coupled between the first and second heat exchanging parts, an insulation part between the liquid state refrigerant flow part and each of the first and second heat exchanging parts, wherein the first and the second heat exchanging parts comprise a plurality of capillaries.

20. Canceled

21. (Previously Presented) The mobile terminal of claim 19, comprising a dissipating plate that thermally couples the second heat exchanging part with said case.

22. (Original) The mobile terminal of claim 19, wherein said phase change material part includes a material based on paraffin or a material based on eutectic salts.

23. (Previously Presented) The mobile terminal of claim 19, wherein the mobile terminal is a cellular phone, portable electronic device, a personal digital assistant (PDA) or a PDA phone.

24. (Currently Amended) The mobile terminal of claim 19, wherein the heat dissipation system comprises a heat pipe coupled to the device that extends to outside the case, and wherein an antenna separate from the heat pipe passes through an opening in the case that includes inner portion of the heat pipe.

25. (Previously Presented) A personal digital assistant (PDA), comprising:
a display screen housed with in a case;
an input device;
an antenna;
a controller operatively coupled to the display screen, the input device and the antenna; and

 a heat dissipation system coupled to the controller, comprising,
 a housing having a refrigerant contained within a closed system,
wherein the closed system comprises,
 a coolant reservoir,

a first heat exchanger coupled to the coolant reservoir configured to absorb heat through a thermal contact,

a second heat exchanger operatively coupled to first heat exchanger that is configured to dissipate the heat,

a liquid state refrigerant flow part coupled between the second heat exchanger and the coolant reservoir, and

an insulation part between the liquid state refrigerant flow part and each of the coolant reservoir and the first and second heat exchangers, wherein the insulation part includes gas or an insulating material.

26. (Previously Presented) The personal digital assistant of claim 25, wherein the PDA is a cellular phone, portable electronic device, or a PDA phone.

27. (Previously Presented) The mobile device of claim 11, wherein the insulation part includes gas or an insulating material, wherein the mobile device is a cellular phone, portable electronic device, a personal digital assistant (PDA) or a PDA phone.

28. (Previously Presented) The micro-cooling heat dissipation system of claim 12, wherein said closed system comprises a first fluid passage directly connecting the first and second heat exchangers, wherein a cross-section of the first fluid passage increases between the first and second heat exchangers.

29. (Previously Presented) The micro-cooling heat dissipation system of claim 28, wherein a cross-section of the first fluid passage increases in a first section configured to connect to the first heat exchanger and the cross-section of the first fluid passage is constant in a second section, and wherein the first fluid passage has a plurality of first guides forming channels extending along the first and second sections to separate flow of the refrigerant in a vapor state.

30. (Previously Presented) The micro-cooling heat dissipation system of claim 12, wherein the closed system comprises:

a first fluid passage coupled between the first and second heat exchangers that has a plurality of first guides to separate flow of the refrigerant in a vapor state; and

a plurality of second guides configured to guide movement of a liquid state refrigerant from an output end of the liquid state refrigerant flow part around the insulation part to the coolant reservoir.

31. (Previously Presented) The micro-cooling heat dissipation system of claim 30, wherein the closed system comprises:

a plurality of third guides configured to guide movement of the liquid state refrigerant from the second heat exchanger around the insulation part to an input end of the liquid state refrigerant flow part, wherein the third guides are fewer in number than the second guides.

32. (Currently Amended) The micro-cooling heat dissipation system of claim 12, wherein the insulation part varies in size as it extends along the liquid state refrigerant flow part or is between the liquid state refrigerant flow part and the coolant reservoir.

33. (Previously Presented) The micro-cooling heat dissipation system of claim 12, comprising:

a plurality of projecting pins formed outside the housing adjacent to the condensation part, wherein the plurality of pins comprise thermoelectric elements configured to generate energy by converting heat emitted through the housing.